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THE GALL MIDGES (DIPTERA: CECIDOMYIIDAE) OF *BACCHARIS* SPP. (ASTERACEAE) IN THE UNITED STATES

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Abstract.—The gall midge fauna of *Baccharis* in the United States now includes 12 species. Four species were previously known to attack *Baccharis* in the United States: three species of *Neolasioptera, N. baccharicola* Gagné, *N. lathami* Gagné, and *N. rostrata* Gagné, and *Rhopalomyia californica* Felt. Three new species and a new genus to contain one of them are described: *Asphondylia bacchariola* Gagné, *Rhopalomyia sulcata* Gagné, and *Xipholasioptera* Gagné and its monotypic type species *Xipholasioptera ensata* Gagné. Five other species, three species of *Asteromyia,* a *Contarinia* sp., and a *Dasineura* sp., are placed only to genus because of insufficient material for further determination. *Rhopalomyia baccharis* Felt is considered a junior synonym of *R. californica.* A key is given to the feeding niche for the 12 species.

Key Words: Diptera, gall midges, Cecidomyiidae, fauna of *Baccharis*

Baccharis (Asteraceae), a genus endemic to the New World, contains 21 species that occur in the United States. These plants are woody, 0.5–4.0 m in height, and dioecious. Three species, *Baccharis halimifolia* L., *B. neglecta* Britt., and *B. pteronioides* DC., are weedy shrubs of economic importance. They invade pastures, rangelands, and recreation areas, and are unpalatable or toxic to livestock. *Baccharis halimifolia,* introduced into Australia as an ornamental but turned pest because of its invasive nature, has been controlled there to some extent by *Rhopalomyia californica* Felt, a gall midge introduced from California. Cultivated varieties of two other species, *Baccharis sarothroides* Gray and *B. pilularis* DC., are valuable for xeroscaping and are commercially available in western United States (Boldt 1989).

In this paper we review the gall midge fauna of *Baccharis* in the United States. Twelve species are treated, including three new to science and several others that remain undescribed. Most of the newly recorded species and specimens in this study were collected by one of us (PEB) as part of a general survey of the phytophagous insects on *Baccharis* in southwestern United States (Boldt and Robbins 1994). The gall midges we list, except possibly the *Contarinia* sp. and the *Dasineura* sp., appear to be specific to *Baccharis* and belong to species groups or genera restricted to Asteraceae.

METHODS

The field work for this paper was done under the direction of P. E. Boldt, the taxonomy by R. J. Gagné. Galls were collected from *Baccharis* in southwestern United States from 1986 to 1993 and gall midges obtained by P. E. Boldt. Galls were re-

moved from affected plants and dissected to obtain larvae, or held in small containers until adults emerged. Specimens for study were killed and preserved in 70% ethanol. All the specimens listed are in the National Museum of Natural History (USNM), Washington, D.C. Study specimens were slide mounted for identification and scientific study using the method outlined in Gagné (1989, 1994). Terminology for adult morphology follows usage in McAlpine et al. (1981); that for larval morphology follows Gagné (1989).

Key to Larval Niche of Nearctic Gall Midges Infesting *Baccharis*

Details on each species in the key are under the alphabetically arranged generic and species headings that follow.

1. In or on mature flowers 2
– In unopened buds, leaves or stems 3
2. Free in flowers ..... *Contarinia* sp. and *Dasineura* sp.
– In swollen flower receptacles ..... *Neolasioptera rostrata*
3. Conical or spherical complex galls on buds or leaves 4
– Simple swellings of leaves or stems 6
4. Spherical, spongy bud galls (Fig. 3) ..... *Rhopalomyia californica*
– Conical or columnar galls (Figs. 1, 4–5) 5
5. Conical apical gall formed by fused apical bud leaves and usually surrounded by rosette of leaves (Fig. 1) ..... *Asphondylia bacchariola* and *Xipholasioptera ensata*
– Conical or columnar galls (Figs. 4–5) ..... *Rhopalomyia sulcata*
6. Swollen leaves or epidermis of green stems ..... *Asteromyia* spp.
– Swollen stems of branchlets (Fig. 2) 7
7. Irregular swelling, often soft when young and often on upper part of stem (Fig. 2) ..... *Neolasioptera lathami*
– Spherical, hard, woody stem swelling at base of plant ..... *Neolasioptera baccharicola*

Nearctic Gall Midges of *Baccharis*

Asphondylia bacchariola Gagné, new species

Adult (female only).—Head: Antenna: scape cylindrical, ca. 1.8 times length pedicel; pedicel about as wide as long; first flagellomere about 2.3 times length of scape, evenly cylindrical. Eye facets close together, hexagonoid. Frons with 15–20 setae per side. Labellum (Fig. 6) hemispherical, laterally with 18–20 setae. Palpus (Fig. 6) with three segments, segments two and three each longer than the preceding.

Thorax: Wing length, 3.2–3.4 mm. Scutum with 2 dorsocentral and a lateral row of setae on each side, mixed with setiform scales. Anepisternum with scales on dorsal half, anepimeron covered with setae and scales. Claws of all legs subequal in size and similar in shape, as long as empodia (Fig. 7).

Abdomen: Ovipositor about 1.8 times as long as seventh sternite.

Pupa (Figs. 8–10).—Antennal horns blunt at apex in frontal view. Frons with bifid upper horn and trifid lower horn. Spines of seventh and eighth abdominal segments arranged as in Fig. 10.

Larva.—Third instar: Spatula and associated papillae as in Fig. 13; 3–4 lateral papillae present on each side of spatula (specimen shown with 4 on one side, 3 on the other); terminal segment (Figs. 11–12) with 8 papillae, 2 of them corniform, the remaining each with tiny seta.

Holotype.—Third instar, from apical leaf fascicle gall of *Baccharis pteronioides,* Appleton-Whittel Research Ranch, 4 mi. S Elgin, Santa Cruz Co., Arizona, 13-VII-1988, T. O. Robbins, deposited in USNM.

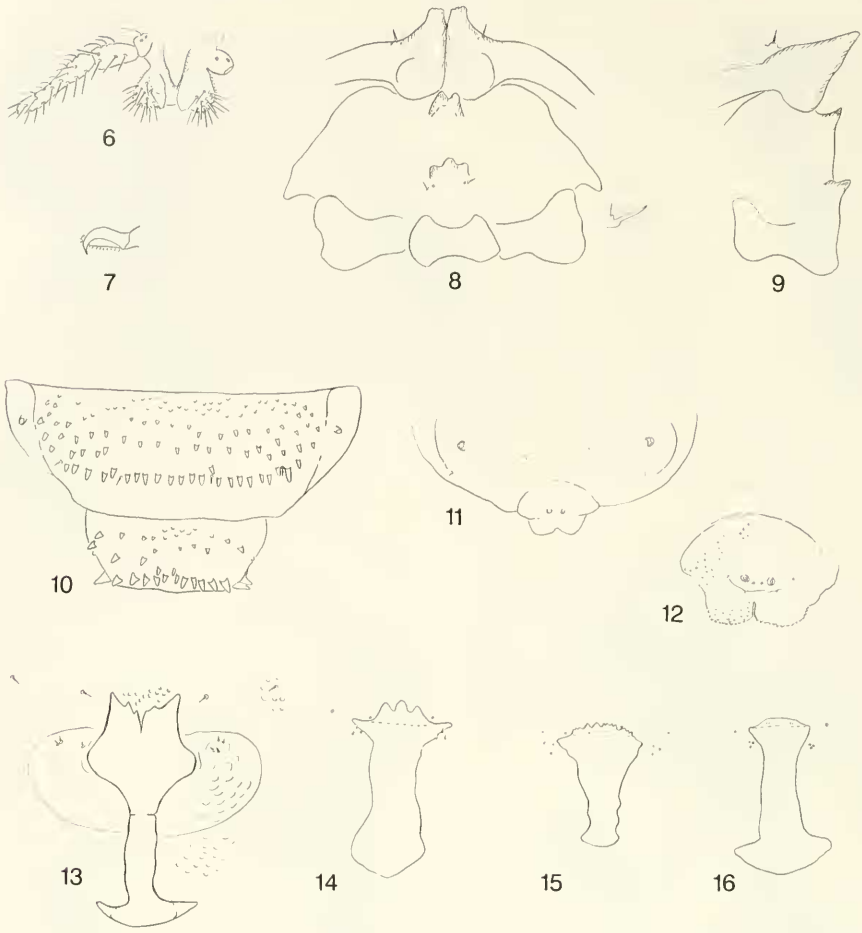
Paratypes.—Arizona: 3 pupal exuviae, 5 ♀, same data as holotype; first instar, same data as holotype except collected on 16-V-1989. Texas: 1 pupal exuviae, *Baccharis pteronioides,* CDRI Arboretum, 4 mi. SE Ft. Davis, Jeff Davis Co., 3-V-1988, P. E. Boldt; Texas: third instar, 2 pupal exuviae, 4 ♀, *Baccharis pteronioides,* Frijole Visitor Center, Guadalupe Mts. National Park, Culberson Co., 21-VIII-1988, P. E. Boldt.

Additional material.—Arizona: galls, same data as holotype; galls, pupae, *Baccharis pteroniodes,* Cochise Co., Hwy 82, 5 mi W junction Hwy 90, 28-IV-1994, T.

Figs. 1–5. Cecidomyiid galls of *Baccharis* spp. 1, *Asphondylia baccharíola* on *B. pteronioides,* Elgin, AZ (1 and 2×). 2, *Neolasioptera lathami* on *B. halimifolia,* Orient, NY (1×). 3, *Rhopalomyia californica* on *B. pilularis,* Alameda Co., CA (1 and 2×). 4, *Rhopalomyia sulcata* on *B. salicifolia,* nr. Carlsbad, NM (1 and 2×). 5, *Rhopalomyia sulcata* on *B. neglecta,* nr. Iraan, TX (1 and 2×).

O. Robbins. Texas: gall, *Baccharis pteronioides,* CDRI Arboretum, 4 mi. SE Ft. Davis, Jeff Davis Co., 3-V-1988, P. E. Boldt; galls, *Baccharis pteronioides,* 20 mi. W Ft. Davis, Jeff Davis Co., 21-III-1990 and 10-V-1990, T. O. Robbins; gall, *Baccharis pteronioides,* Frijole Visitor Center, Guadalupe Mts. National Park, Culberson Co., 21-VIII-1988, P. E. Boldt; galls, one with pupal exuviae, *Baccharis pteronioides,* Frijole Visitor Center, Guadalupe Mts. National Park, Culberson Co., 15-VI-1989, T. O. Robbins. Additional galls from *Baccharis bigelovii* similar to those from *B. pteronioides* but without gall midge specimens are tentatively referred to *A. baccharíola:* Arizona: gall, Ash Canyon, Huachuca Mts., Cochise Co., 14-VIII-1990, P. E. Boldt; galls, Coronado National Memorial, Huachuca Mts., Cochise Co., 14-VIII-1990, P. E. Boldt.

Etymology.—The name *baccharíola* is an adjective combining the name of the plant host genus with a diminutive suffix.



Figs. 6–16. Figs. 6–11, *Asphondylia baccharioia*. 6, Adult mouthparts (incomplete). 7, Foretarsal claw and empodium. 8, Pupal head, ventral. 9, Same, lateral. 10, Pupal seventh and eighth abdominal segments, dorsal. 11, Larval eighth and terminal abdominal segments, dorsal. 12, Detail of larval terminal segment, dorsal. 13, Larval spatula and associated papillae. Figs. 14–16, *Asteromyia* spp., larval spatulae. 14, *Asteromyia* sp. 1 from *B. angustifolia*. 15, *Asteromyia* sp. 2 from *B. pteronioides*. 16, *Asteromyia* sp. 3 from *B. salicina*.

Gall (Fig. 1).—Each gall is made up of several leaves forming a conical, one-celled cylinder about 4 mm long and contains a single larva or pupa. Galls appear singly at the apices of branches, are green at first, but turn brown after the single larva in each gall changes to the pupal stage. The interior gall surface is covered with a white fungal mycelium while the larva is alive.

Distribution.—Arizona and western Texas.

Hosts.—*Baccharis pteronioides* and possibly *B. bigelovii*. The gall is similar on both plants but no gall midge specimens were found on the latter host to make a positive identification.

Remarks.—*Asphondylia* is a cosmopolitan genus with some 260 described species that mostly form galls in flowers and fruit of many families of plants. This new species falls within a group of *Asphondylia* that occur on Asteraceae and are characterized by having the adult labella setose and the pupal upper frontal horn bifid. A thorough comparison of this new species with other western Nearctic species from Asteraceae is

not possible because most named species were described only on the basis of the adult stage. Adults of *Asphondylia* species have few diagnostic characters (Hawkins et al. 1986, Gagné and Waring 1990). Larvae of none of the western species from Asteraceae have been described; pupae are known only from *Asphondylia chrysothamni* Felt and *Asphondylia enceliae* Felt and are similar to that of the new species. The ovipositor of *A. chrysothamni* is somewhat longer at 2.1 times the length of the seventh abdominal sternite, and the tarsal claws of *A. enceliae* are longer and thinner than on the new species.

Asphondylia baccharis Kieffer and Herbst (1905) is known from Chile from a plant tentatively identified as *Baccharis* sp. The gall is reportedly a deformed floret 2.5–3.0 mm long, black, thin walled, and covered with hairs. The adult and pupa were only sketchily described and are presumed lost (Gagné 1994), so it is impossible to compare this species with *A. bacchariola.*

Asteromyia spp.

This genus belongs to the supertribe Lasiopteridi and tribe Alycaulini (Gagné 1994). Larvae of *Asteromyia* spp. are found in blister galls of leaves or green stems of various Asteraceae. Larvae are flattened and ovoid and have a generally reduced number of papillae with short setae. There are only three lateral papillae on each side of the spatula and only four terminal papillae.

Gagné (1968) considered a larval specimen from *Baccharis* in Texas to be *Asteromyia gutierreziae* because it was similar to larvae of that species. Two other kinds of larvae based on differences in the spatulae (Figs. 14–16) have since been found. Without pupae and adults, nothing more can be done to identify these. Because the spatulae are so different, the larvae are placed here as *Asteromyia* sp. 1, sp. 2, and sp. 3.

Analogous blister galls on *Baccharis* in the Neotropics are formed by *Geraldesia* spp. (Gagné 1994). Adults of *Geraldesia* are superficially similar to *Asteromyia,* but larvae of *Geraldesia* are elongate and cylindrical instead of ovoid and flat and pupae are pigmented and sclerotized instead of hyaline and soft as in *Asteromyia.*

Asteromyia sp. 1, near *gutiereziae* Felt

This segregate is known from a single larva with a three toothed spatula (Fig. 14) similar to that found in *A. gutierreziae.* It was placed under *A. gutierreziae* in Gagné (1968). The specimen was taken from a blister leaf gall on *Baccharis angustifolia* (probably =*salicina*) collected in Kenedy Co., Texas, 20-XII-1940 by R. Runyon and found in the botanical collections of the USNM.

Asteromyia sp. 2

The larval spatula (Fig. 15) of this segregate has many fine serrations along the anterior edge. It is known from two specimens from Texas, each from a different species of *Baccharis*: *B. pteronioides,* Frijole Ranch, Guadalupe Mountains National Park, Culberson Co., Texas, X-16-1990, P. E. Boldt; and *B. bigelovii,* Point of Rocks, 12 mi. W Ft. Davis, Jeff Davis Co., Texas, VI-12-1990, P. E. Boldt.

Asteromyia sp. 3

The larval spatula of this segregate has a smooth anterior edge (Fig. 16). The single known larva was taken from a blister gall of *B. salicina,* Greenbelt Reservoir, 4 mi. N Clarendon, Donley Co., Texas, X-5-1988, P. E. Boldt and T. O. Robbins.

Contarinia sp.

Contarinia is a very large genus of some 250 species in the world. Larvae of most species live in leaf rolls or bud galls, but many live freely and gregariously among flower heads, as does the species on *Baccharis* spp. Most are known from one host species, some feed on more than one species of a genus, and at least one is polyphagous (Gagné 1995). *Contarinia* larvae

have been taken in flower heads of several species of *Baccharis* spp. but have not been reared to the adult stage. Many *Contarinia* spp. that live in flower buds, including the species reared from *Baccharis* spp., have the hind spiracles situated on posteriorly directed lobes, as shown in Gagné (1989).

Specimens in the USNM collected from *Baccharis* flower heads are as follows: *Baccharis glomeruliflora,* Miami, Florida, 12-XI-1970, C. E. Stegmaier, Jr., 3 larvae; *Baccharis halimifolia,* Cambridge, Dorchester Co., MD, 14-X-1984, V. Krischick; *Baccharis pteronioides,* Lincoln National Forest, Carlsbad, Eddy Co., New Mexico, 21-V-1989, P. E. Boldt & R. J. Gagné, 5 larvae; *B. pteronioides,* Rt. 137, 1 mi. S junction to Sitting Bull Falls, Carlsbad, Eddy Co., New Mexico, 21-V-1989, P. E. Boldt & R. J. Gagné, 10 larvae; *B. pteronioides,* Hwy. 45, 7 mi. E Durango, Durango, Mexico, 4-VIII-1988, P. E. Boldt, 5 larvae; *Baccharis salicina,* Sitting Bull Falls, Lincoln National Forest, Eddy Co., New Mexico, 16-VIII-1989, T. O. Robbins.

Dasineura sp.

Dasineura is a large, catchall genus with over 350 species described in the world. Many species form simple galls, including leaf rolls and swollen buds, but many live gregariously in flower heads. Larvae of an unidentified species were collected in association with *Contarinia* sp. larvae on flower heads of *B. halimifolia,* Cambridge, Dorchester Co., MD, 14-X-1984, by V. Krischick, and from *B. salicina,* Sitting Bull Falls, Lincoln National Forest, Eddy Co., New Mexico, 16-VIII-1989, by T. O. Robbins. A typical *Dasineura* sp. larva is figured on page 67 of Gagné (1989).

Neolasioptera spp.

Neolasioptera is a large American genus of about 175 described species that live mainly in stem, petiole, or midrib swellings of various plants, but also in achenes or other flower parts of Asteraceae. Three North American species are known from *Baccharis,* as follows:

Neolasioptera baccharicola Gagné

This species forms a hard, woody gall at the base of the stem of *B. halimifolia.* It is known only from a series reared from galls taken at Virginia Beach, Virginia, V-1960, by F. D. Bennett (Gagné 1971).

Neolasioptera lathami Gagné

Galls (Fig. 2) of this species can be found near the base of the plant as well as among apical branches of *B. halimifolia, B. neglecta, B. salicina,* and *B. sarothroides.* This species has two or more generations per year. It is known from New York south to Florida and west to Texas and Arizona (Gagné 1989). Palmer and Bennett (1988) recommended this species for introduction into Australia to control *B. halimifolia,* and Diatloff and Palmer (1987) reported on its biology and host specificity.

Neolasioptera rostrata Gagné

This species forms galls in receptacles of both male and female flowers (Gagné and Boldt 1989). It is widespread in the United States, from Maryland, Florida, Texas, and New Mexico where it occurs on *B. glomeruliflora, B. halimifolia, B. salicina,* and *B. neglecta.* It also occurs in the Dominican Republic on *B. myrsinities* (Gagné and Boldt 1989), and P. E. Boldt has found it also in Argentina on *B. pingraea* and *B. spartioides* (Gagné 1994).

Rhopalomyia spp.

Rhopalomyia is a large, worldwide genus of about 150 gallforming species that mostly occur on Asteraceae. Two species have been described from *Baccharis pilularis* from California, but one, *Rhopalomyia baccharis* Felt, is considered here a junior synonym of *R. californica.* A new species is described from several species of *Baccharis* growing in Texas to Arizona.

Rhopalomyia californica Felt

This species forms lobed, succulent, usually leafy bud galls (Fig. 3) on *B. pilularis* in California. It was imported into Australia as a potential biocontrol agent of *B. halimifolia* in 1969 and 1982. The gall midge took hold only after the 1982 introduction and since then has effectively established itself in Queensland and New South Wales (McFadyen 1985, Julien 1992, Palmer et al. 1993). It was also introduced into Texas in 1985 to control *B. halimifolia* and *B. neglecta*. Typical galls were observed on *B. neglecta* at Belton, Texas in 1986, but none was subsequently found (Boldt, unpub. data). The ecology of this species and its parasites has been investigated by Ehler (1982, 1987, 1992) and Ehler and Kinsey (1990, 1991, 1993). This species is very similar to *Rhopalomyia sulcata* Gagné. Differentiation between the two species is made under *R. sulcata*.

Rhopalomyia baccharis (Felt 1908) is here considered a junior synonym of *R. californica*. *Rhopalomyia baccharis* was reportedly reared from unspecified stem galls collected in December, 1885 on *B. pilularis*, presumably in California but unstated (Felt 1908, 1915). The two syntypes, one of each sex, that Felt studied are labelled "#3849, Dec. 19, 85" and "Type No. 29333 U.S.N.M." They differ from most specimens of *R. californica* in having two instead of one segmented palpi. The gonostylus of the male syntype of *R. baccharis* appears more bulbous than in *R. californica* because it is laterally compressed on the slide mount. In the USNM collection are pinned specimens with the same first label as the types and an additional one that reads, "C.V. Riley Collection." Four males were slide-mounted to compare them properly with the syntype. Their gonostyli do not appear bulbous as in the syntype but are similar to that shown for *R. californica* (Fig. 20). In addition, two of the specimens have two-segmented palpi like the syntypes, but two have one-segmented palpi. Specimens reared from *R. californica* galls usually have one-segmented palpi, but occasional specimens are found with two-segmented palpi. L. E. Ehler (in litt.) writes that in outbreak conditions, galls commonly occur all along the shoots, especially when the terminals of the shoots are already galled. The unspecified "stem gall" made by this *R. baccharis* could have come from such a gall. It appears, then, that there is no reason to maintain *R. baccharis* as a distinct species.

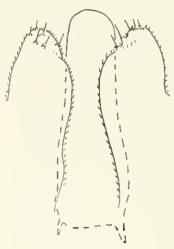
***Rhopalomyia sulcata* Gagné, New Species**

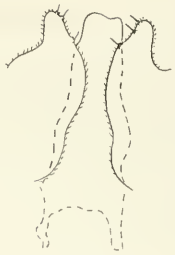
Adult.—Head: Eyes joined, about 5 facets long at vertex. Male antenna with 16–17 flagellomeres, neck of third flagellomere about ½ length of node. Female antenna with 15–16 flagellomeres without distinct necks. Frontoclypeus with 5–12 setae per side. Labellae fused, each with 1–10 setae. Palpus of one short, elliptical segment with 2–10 setae.

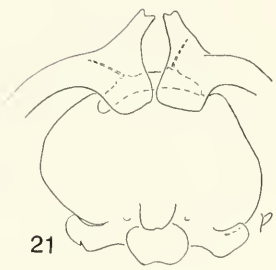
Thorax: Wing length, ♂ 2.9–3.3 mm; ♀, 2.2–2.5 mm. Anepimeron with 12–20 setae. Claws simple. Empodia slightly longer than claws. Pulvilli about ⅔ length claws.

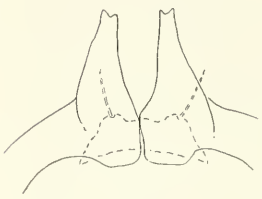
Male abdomen: Tergites 1–7 rectangular, with mostly single row setae on posterior margin intermixed with a few scales, a group of several setae laterally, and pair of anterior trichoid sensilla. Tergite 8 narrower and with sparser to no setae posteriorly and laterally but with pair of anterior trichoid sensilla. Pleura with scales. Sternites 2–8 covered with setae except for a small area about ⅔ distance from anterior edge, all with anterior pair of trichoid sensilla. Genitalia (Figs. 17–18): Gonocoxite cylindrical. Gonostylus elongate-cylindrical, tapering to narrow, toothed apex. Cerci rounded apically with several setae on disk and along apex. Hypoproct convex apically with 1–2 pairs of apical setae. Claspettes and aedeagus blunt tipped, aedeagus about as long as hypoproct.

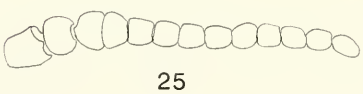
Female abdomen: Tergites 1–6 rectangular, with mostly single row of setae on

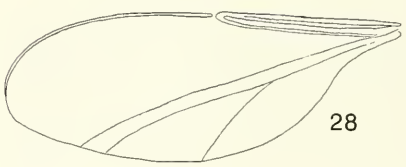


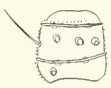


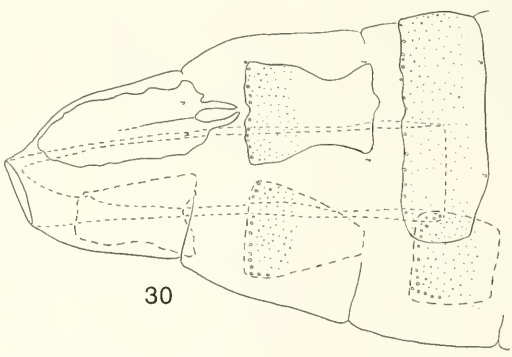












Figs. 17–30. Figs. 17–18, *Rhopalomyia sulcata.* 17, Genitalia, dorsal. 18, Claspettes and aedeagus, dorsal. Figs. 19–20, *Rhopalomyia californica.* 19, Claspettes and aedeagus, dorsal. 20, Gonostylus, dorsal. Figs. 21–22, *Rhopalomyia sulcata.* 21, Pupal head, ventral. 22, Same, lateral. Figs. 23–24, *Rhopalomyia californica.* 23, Pupal antennal horns and prothorax. 24, Pupal head, lateral. Figs. 25–30, *Xipholasioptera ensata,* female. 25, Antenna. 26, Third flagellomere, ventral. 27, Same, dorsal. 28, Wing. 29, Tip of ovipositor, including hypoproct and fused cerci. 30, Abdomen, sixth segment to end, dorsoventral.

posterior margin, rarely with scales intermixed, 1 to several setae laterally, and a pair of anterior trichoid sensilla; tergite 7 narrower than preceding tergite, with double row of posterior setae and pair of anterior trichoid sensilla; tergite 8 wedge shaped, narrower but longer than preceding tergite and narrowest posteriorly, with several short setae on posterior third. Pleura with scales. Sternites 2–7 with sparser setae than in male, setae present only posteriorly and anteromesally, each with pair of trichoid sensilla anteriorly. Distal half of ovipositor about 3 times length of seventh tergite, fused cerci bulbous, covered with setae and setulae.

Pupa.—Head as in Figs. 21–22. Antennal horns moderately elongate, bifid in frontal view. Face without horns. Prothoracic spiracle short.

Larva.—Unknown.

Holotype.—From columnar gall on *B. salicina,* Pecos R., Loving, Eddy Co., New Mexico, 12-IV-1990, T. O. Robbins, emerged 22-IV-1990, deposited in USNM.

Paratypes.—All from columnar galls: same data as holotype, pupa, 9 ♂, 5 ♀; same data as holotype except 19-VII-1990, ♂, pupal exuviae; same data as holotype except 20-V-1989, P. E. Boldt; *B. salicina,* Pecos R., Iraan, Pecos Co., Texas, 11-IV-1990, T. O. Robbins, pupa; *B. neglecta,* Pecos R., Iraan, Pecos Co., Texas, 2-II-1990, emerged 7-II-1990, T. O. Robbins, 3 ♂ on slides; *B. pteronioides,* Appleton-Whittel Research Ranch, 4 mi. SE Elgin, Santa Cruz Co., Arizona, 8-III-1991, emerged 18 to 20-III-1991, P. E. Boldt and T. O. Robbins, 2 pupae, 4 ♂, 1 ♀; *B. salicina,* Sitting Bull Falls, Lincoln National Forest, Eddy Co., New Mexico, 22-VIII-1988, P. E. Boldt, 2 ♀; *B. halimifolia,* greenhouse, Temple, Texas, 21-III-1988, T. O. Robbins, 4 ♂, 2 ♀, 3 pupal exuviae.

Other material examined.—Same data as holotype, 3 galls; *B. neglecta,* Pecos R., Iraan, Pecos Co., Texas, 2-II-1990, emerged 7-II-1990, T. O. Robbins, 2 ♂, 3 ♀, 5 galls on pins; *B. pteronioides,* Appleton-Whittel Research Ranch, 4 mi. SE Elgin, Santa Cruz Co., Arizona, 8-III-1991, gall; *B. pteronioides,* Hwy 61, 8 km N La Ascension, Nuevo Leon, Mexico, 28-IV-1990, P. E. Boldt, gall; *B. heterophylla,* Hwy 23, 7 mi S Durango, Durango, Mexico 5-VIII-1988, P. E. Boldt, galls; *B. salicina,* Rt. 31, under Pecos R. bridge, near Carlsbad, New Mexico, 20-V-1989, P. E. Boldt, ♀, galls; *B. neglecta,* Hwy 190, 1 mi. E Iraan, Pecos Co., Texas, 11-I-1990, T. O. Robbins, 10 galls; *B. neglecta,* Eagle pass, Maverick Co., Texas, 17-V-1994, T. O. Robbins, galls; *B. sarothroides* in greenhouse, Temple Texas, T. O. Robbins and P. E. Boldt, pupae and galls; *B. sarothroides,* Sierra Vista, Cochise Co., Arizona, galls.

Etymology.—The name sulcata is an adjective meaning furrowed, with reference to the furrowed surface of the gall.

Distribution.—United States: Arizona, New Mexico, western and southern Texas; Mexico: Durango, Nuevo Leon.

Hosts: This species is reported from *B. halimifolia, B. heterophylla, B. neglecta, B. pteronioides, B. salicina,* and *B. sarothroides.* The record on *B. heterophylla* is based only on similarity of the galls, but the other host records are based on adults and/or pupae. A generation of *R. sulcata* was reared from *B. halimifolia* and *B. sarothroides* in a greenhouse from a generation that came from field-collected galls on *B. salicina.*

Remarks.—Males from *B. pteronioides* differ slightly from males from *B. halimifolia, B. neglecta,* and *B. salicina* in the shape of the hypoproct. The apex in dorsoventral view is convex in specimens from *B. pteronioides,* concave in the other hosts, but for now all specimens are considered to be the same species.

Rhopalomyia sulcata differs from *R. californica* in the male genitalia and the pupa. *Rhopalomyia californica* has a shorter gonostylus, apically oblique instead of blunt claspettes (compare Figs. 17–18 with 19–20), and longer pupal antennal horns (compare Figs. 21–22 with 23–24).

Xipholasioptera Gagné, New Genus

Adult (female only).—Head: antenna (Figs. 25–27) with 11 flagellomeres; first and second flagellomeres connate, as wide as pedicel, the remaining flagellomeres narrower, cylindrical. Palpus four segmented. Labella short, hemispherical.

Thorax: Wing (Fig. 28): R5 joining C near midlength of wing; M 3 + 4 and Cu weak. Scutum with four longitudinal rows of setae and scales, the rows of scales almost contiguous. Anepisternum with scales on dorsal third; mesepimeron covered with setae and scales; katepisternum bare. Tarsal claws with large tooth; empodia as long as claws.

Abdomen (Figs. 29–30): First through sixth tergites rectangular, more than twice as wide as long, with anterior pair of trichoid sensilla, posterior margin with single, sparse row of setae, and otherwise covered with scales; seventh tergite rectangular, about twice as long as wide, with anterior pair of trichoid sensilla, posterior margin with single row of setae, and covered with scales on posterior two-fifths; eighth tergite elongate, pointed posteriorly, about twice as long as wide, not including the narrow, anterior extensions, with anterior pair of trichoid sensilla as only vestiture; second to sixth sternites square, without anterior pair of trichoid sensilla but with setae laterally and posteriorly and scales elsewhere; seventh sternite triangular, narrowest anteriorly, somewhat longer than wide, posterior margin with single row of setae, and covered with scales on posterior two-fifths; eighth sternite about twice as long as wide, narrowing posteriorly, without vestiture; ovipositor elongate, posterior half bilaterally flattened, strongly sclerotized, pointed apically.

Pupa and larva.—Unknown.

Type species.—*Xipholasioptera ensata* Gagné.

Etymology.—The name *Xipholasioptera* combines the Greek "xiphos" for sword, with reference to the shape of the ovipositor, and "lasioptera" for the scale-covered wing. The latter segment is a common suffix in the tribes Alycaulini and Lasiopterini. The name is feminine.

Remarks.—This genus belongs to the tribe Alycaulini of the supertribe Lasiopteridi, as defined in Gagné (1994), because of the thick covering of scales, the very short R5 wing vein, the short antenna, and the lack of two lateral groups of large setae on the eighth abdominal segment. This genus differs from all known Alycaulini in the shape of the postabdomen and ovipositor (Fig. 30) and in the lack of the anterior pair of trichoid sensillae on each of the abdominal sternites. The strongly modified abdomen so obscures relationships that the closest relative of *Xipholasioptera* is not apparent. All other genera of Alycaulini except *Protaplonyx* and *Edestosperma* have soft, cylindrical ovipositors. *Protaplonyx,* known form one species on a *Sarcobatus* (Chenopodiaceae), has only the eighth abdominal tergite of the female modified and has a very different, short, strongly sclerotized ovipositor (Gagné 1969); *Edestosperma,* known from one species reared from seeds of a grass, has the seventh and eighth tergites and eighth sternite modified and a short, bilaterally flattened, but soft ovipositor (Gagné 1969).

Xipholasioptera ensata Gagné, New Species

Adult (female only).—Antenna as in Figs. 25–27. Wing length, 1.7 mm, venation as in Fig. 28. Abdomen as in Figs. 29–30; dorsal area of fused cerci weakly striate, devoid of setae; a longitudinal row of setae present on each side, below which cerci pitted and not so strongly pigmented; hypoproct short, narrow, with apical pair of short setae.

Pupa and larva.—Unknown.

Etymology.—The name *ensata* is a Latin adjective meaning swordlike, after the shape of the ovipositor.

Holotype.—Female, ex branch apex of *Baccharis pteronioides,* Pine Springs, Gua-

dalupe Mountains National Park, Texas, V-2-1988, P. E. Boldt, deposited in U.S. National Museum.

Remarks.—The single known specimen was taken in association with leaf fascicle galls made by *Asphondylia bacchariola*. Although this species is known from a single female, it is certainly distinctive and likely to be found again on *Baccharis*. The ovipositor is shaped for piercing and, therefore, the eggs are presumably laid in plant tissue.

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